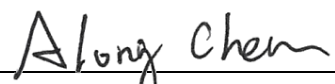


FCC C2PC Test Report

FCC ID : SQG-SU60SOMC
Equipment : 802.11ac Professional Wi-Fi + BT5.0 Module
Model No. : SU60-SOMC (453-00003)
SU60-SOMC-2G (453-00004)
(please refer to section 1.1.1 for more details.)
Brand Name : Laird Connectivity
Applicant : Laird Connectivity, LLC
Address : W66N220 Commerce Court Cedarburg WI
53012 United States Of America (Excluding
The States Of Alaska)
Standard : 47 CFR FCC Part 15.247
Received Date : Aug. 26, 2021
Tested Date : Aug. 26 ~ Sep. 03, 2021

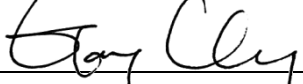
We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:



Along Chen / Assistant Manager

Approved by:



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR841101-05AC	Rev. 01	Initial issue	Oct. 05, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.402MHz 35.20 (Margin -12.61dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 7311.00MHz 52.56 (Margin -1.44dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 28.79	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

This report is prepared for FCC class II change.

This report is issued as a supplementary report to the original project no. FR841101AC. The modification is concerned with following:

- ✧ Revised brand name, Applicant and address.
- ✧ Changed U1 to RT5170A for lower suspend mode current.
- ✧ Added C87 for solve the co-location issue with LTE.

Therefore, related test items had been performed and presented in the following sections.

1.1.1 Product Details

The following models are provided to this EUT.

Brand Name	Model Name	Product Name	Description
Laird Connectivity	SU60-SOMC (453-00003)	802.11ac Professional Wi-Fi + BT5.0 Module	2G/1G MCP
	SU60-SOMC-2G (453-00004)		4G/2G MCP
★ The above models, both options were assessed and SU60-SOMC-2G (453-00004) was found to be worst case and was selected for the final testing.			

1.1.2 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS
2400-2483.5	b	2412-2462	1-11 [11]	1	1-11 Mbps
				2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps
				2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0~7
				2	MCS 0~7
				2	MCS 8~15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	1	MCS 0~7
				2	MCS 0~7
				2	MCS 8~15
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation. Note 4: The device supports TX antenna diversity function. The conducted power of single chain is same for 1TX and 2TX operating mode. Therefore, Ant1 + Ant 2 configuration is chosen for final testing.					

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host
--------------------------	------------------

1.1.4 Antenna Details

Brand	Model	Type	Connector	Gain (dBi)
LSR	001-0009	Dipole	IPEX U.FL	2
Laird	NanoBlade-IP04	PCB Dipole	IPEX U.FL	2
Laird	MAF95310 Mini NanoBlade Flex	PCB Dipole	IPEX U.FL	2.79
LSR	FlexPIFA 001-0016	PIFA	IPEX U.FL	2.5
Ethertronics	WLAN_1000146	Magnetic Dipole	IPEX U.FL	2.5
Laird	MIMO FlexPIFA Antenna	PIFA	IPEX U.FL	2
LSR	001-0009 (with filter)	Dipole	IPEX U.FL	2

1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	AC Adapter	Brand Name: I.T.E POWER SUPPLY Model Name: MU12AY120100-A1 Power Rating: I/P: 100-240Vac, 50/60Hz, 0.3A O/P: 12Vdc, 1A Power Line: 1.48m non-shielded cable w/o core

1.1.6 Channel List

Frequency band (MHz)		2400~2483.5	
802.11 b / g / n HT20		802.11n HT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447	---	---
9	2452	---	---
10	2457	---	---
11	2462	---	---

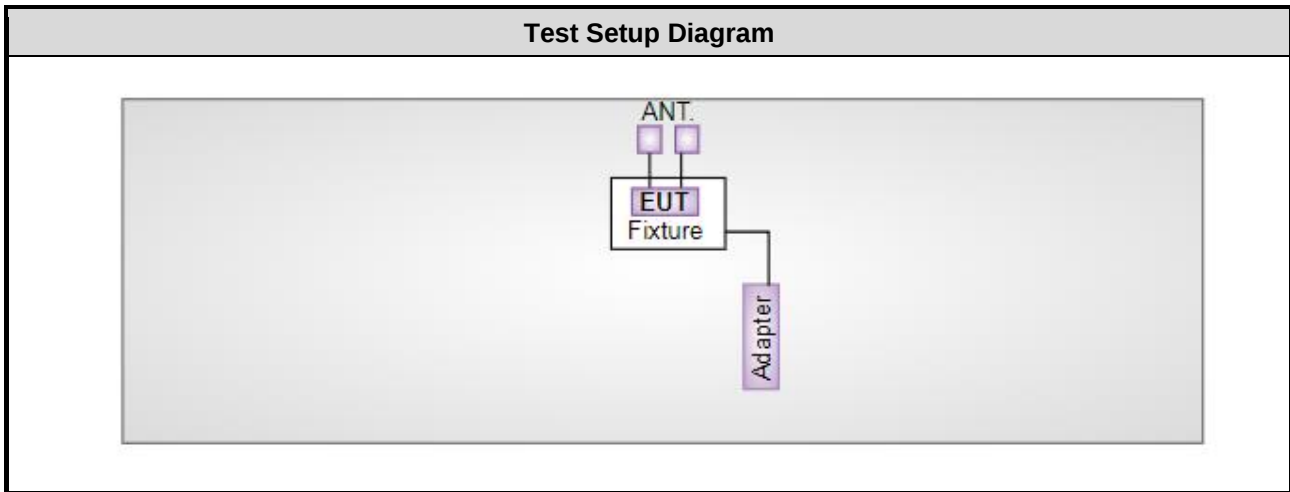
1.1.7 Test Tool and Duty Cycle

Test Tool	Putty, Version: 0.60.0.0		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	100.00%	0.00
	11g	100.00%	0.00
	HT20	100.00%	0.00
	HT40	100.00%	0.00

1.1.8 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	default(16)
11b	2437	default(18)
11b	2462	default(17)
11g	2412	default(14)
11g	2437	default(18)
11g	2462	default(14)
HT20	2412	default(13)
HT20	2437	default(18)
HT20	2462	default(12)
HT40	2422	default(11)
HT40	2437	default(16)
HT40	2452	default(11)

1.2 Test Setup Chart



1.3 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Sep. 02, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
LISN	R&S	ENV216	101579	Mar. 17, 2021	Mar. 16, 2022
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 21, 2020	Oct. 20, 2021
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Aug. 26 ~ Sep. 01, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 12, 2021	Mar. 11, 2022
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2020	Dec. 03, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2020	Dec. 10, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Dec. 31, 2020	Dec. 30, 2021
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Preamplifier	Agilent	83017A	MY39501308	Sep. 26, 2020	Sep. 25, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 14, 2021	Jul. 13, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 06, 2020	Oct. 05, 2021
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 06, 2020	Oct. 05, 2021
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 06, 2020	Oct. 05, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Sep. 03, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Apr. 19, 2021	Apr. 18, 2022
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021
Measurement Software	Sporton	SENSE-15247_DTS	V5.10	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.4 Test Standards

47 CFR FCC Part 15.247
ANSI C63.10-2013

1.5 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	± 34.130 Hz
Conducted power	± 0.808 dB
Power density	± 0.583 dB
Conducted emission	± 2.715 dB
AC conducted emission	± 2.92 dB
Radiated emission ≤ 1 GHz	± 3.41 dB
Radiated emission > 1 GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISSED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	11g	2437	6 Mbps	2
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	1, 2, 3, 4
Maximum Output Power	11b 11g HT20 HT40	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462 2422 / 2437 / 2452	1 Mbps 6 Mbps MCS 0 MCS 0	2
Radiated Emissions >1GHz	11b HT20	2412 2412	1 Mbps MCS 0	1
Radiated Emissions >1GHz	11b HT20	2437 2412	1 Mbps MCS 0	2
Radiated Emissions >1GHz	11b 11g	2462 2412	1 Mbps 6 Mbps	3, 4

NOTE:

- The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.
- 4 types antenna are used for this device, highest gain antenna of each type is selected to perform test as below test configuration.
Configuration 1 : Dipole antenna with 2 dBi gain
Configuration 2 : PCB Dipole antenna with 2.79dBi gain
Configuration 3 : PIFA antenna with 2.5dBi gain
Configuration 4 : Magnetic Dipole with 2.5dBi gain

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.1.2 Test Procedures

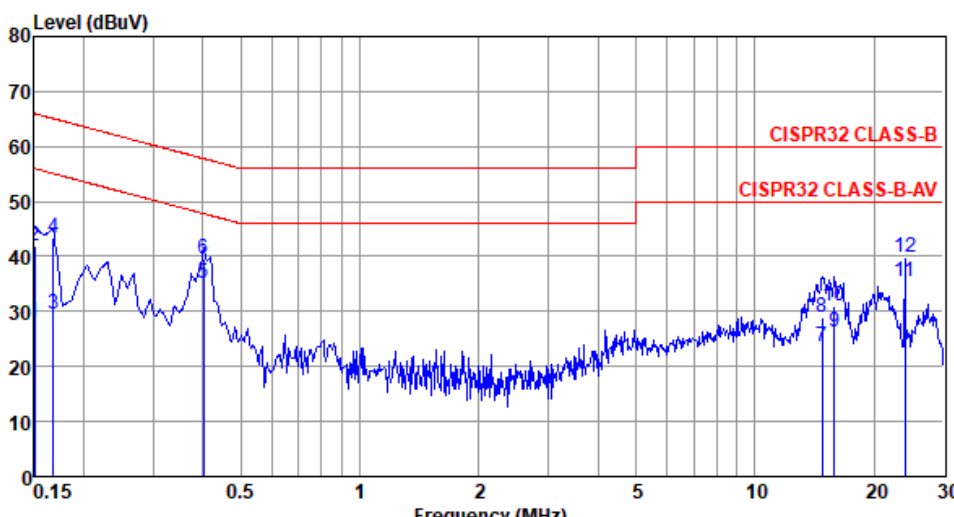
1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

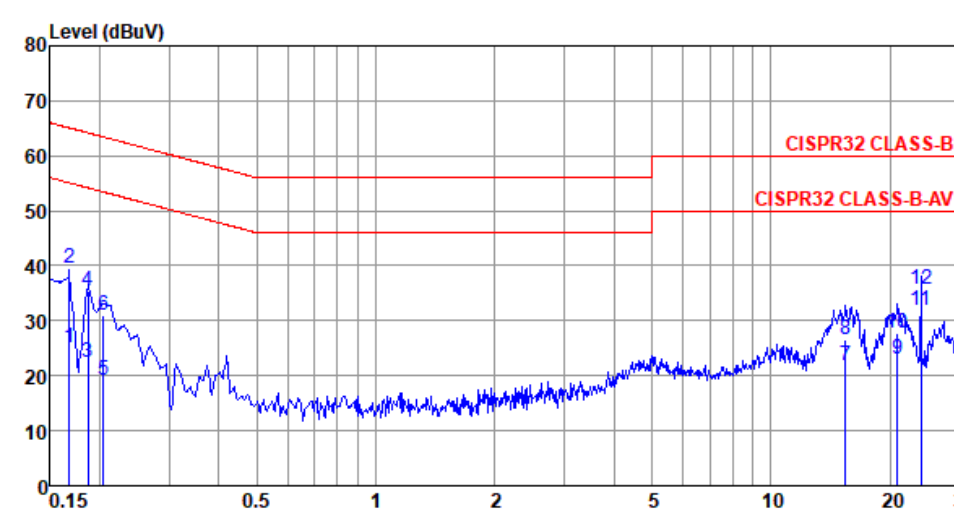
3.1.3 Test Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Modulation	11g	Test Freq. (MHz)	2437																																																																																																																					
Power Phase	Line																																																																																																																							
Test by : Joe Liao Temperature: 22°C Humidity: 64%																																																																																																																								
Level (dBUV)  Frequency (MHz) <table><thead><tr><th></th><th>Freq MHz</th><th>Level dBUV</th><th>Limit Line dBUV</th><th>Over Limit dB</th><th>Read Level dBUV</th><th>Factor dB</th><th>Cable loss dB</th><th>Remark</th></tr></thead><tbody><tr><td>1</td><td>0.150</td><td>27.97</td><td>56.00</td><td>-28.03</td><td>18.09</td><td>9.83</td><td>0.05</td><td>Average</td></tr><tr><td>2</td><td>0.150</td><td>42.02</td><td>66.00</td><td>-23.98</td><td>32.14</td><td>9.83</td><td>0.05</td><td>QP</td></tr><tr><td>3</td><td>0.168</td><td>29.64</td><td>55.08</td><td>-25.44</td><td>19.76</td><td>9.83</td><td>0.05</td><td>Average</td></tr><tr><td>4</td><td>0.168</td><td>43.47</td><td>65.08</td><td>-21.61</td><td>33.59</td><td>9.83</td><td>0.05</td><td>QP</td></tr><tr><td>5*</td><td>0.402</td><td>35.20</td><td>47.81</td><td>-12.61</td><td>25.23</td><td>9.89</td><td>0.08</td><td>Average</td></tr><tr><td>6</td><td>0.402</td><td>39.68</td><td>57.81</td><td>-18.13</td><td>29.71</td><td>9.89</td><td>0.08</td><td>QP</td></tr><tr><td>7</td><td>14.828</td><td>23.51</td><td>50.00</td><td>-26.49</td><td>12.72</td><td>10.20</td><td>0.59</td><td>Average</td></tr><tr><td>8</td><td>14.828</td><td>28.79</td><td>60.00</td><td>-31.21</td><td>18.00</td><td>10.20</td><td>0.59</td><td>QP</td></tr><tr><td>9</td><td>15.885</td><td>26.25</td><td>50.00</td><td>-23.75</td><td>15.43</td><td>10.21</td><td>0.61</td><td>Average</td></tr><tr><td>10</td><td>15.885</td><td>31.12</td><td>60.00</td><td>-28.88</td><td>20.30</td><td>10.21</td><td>0.61</td><td>QP</td></tr><tr><td>11</td><td>24.000</td><td>35.38</td><td>50.00</td><td>-14.62</td><td>24.32</td><td>10.37</td><td>0.69</td><td>Average</td></tr><tr><td>12</td><td>24.000</td><td>39.91</td><td>60.00</td><td>-20.09</td><td>28.85</td><td>10.37</td><td>0.69</td><td>QP</td></tr></tbody></table>					Freq MHz	Level dBUV	Limit Line dBUV	Over Limit dB	Read Level dBUV	Factor dB	Cable loss dB	Remark	1	0.150	27.97	56.00	-28.03	18.09	9.83	0.05	Average	2	0.150	42.02	66.00	-23.98	32.14	9.83	0.05	QP	3	0.168	29.64	55.08	-25.44	19.76	9.83	0.05	Average	4	0.168	43.47	65.08	-21.61	33.59	9.83	0.05	QP	5*	0.402	35.20	47.81	-12.61	25.23	9.89	0.08	Average	6	0.402	39.68	57.81	-18.13	29.71	9.89	0.08	QP	7	14.828	23.51	50.00	-26.49	12.72	10.20	0.59	Average	8	14.828	28.79	60.00	-31.21	18.00	10.20	0.59	QP	9	15.885	26.25	50.00	-23.75	15.43	10.21	0.61	Average	10	15.885	31.12	60.00	-28.88	20.30	10.21	0.61	QP	11	24.000	35.38	50.00	-14.62	24.32	10.37	0.69	Average	12	24.000	39.91	60.00	-20.09	28.85	10.37	0.69	QP
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Note 1: Level (dBUV) = Read Level (dBUV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dB) = Level (dBUV) – Limit Line (dBUV).																																																																																																																								

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Power Phase	Neutral																																																																																																																																									
Test by : Joe Liao Temperature: 22°C Humidity: 64%																																																																																																																																										
Level (dBuV)  <table><thead><tr><th></th><th>Freq</th><th>Level</th><th>Limit</th><th>Over</th><th>Read</th><th>Factor</th><th>Cable</th><th>Remark</th></tr><tr><th></th><th>MHz</th><th>dBuV</th><th>Line</th><th>Limit</th><th>Level</th><th>dB</th><th>loss</th><th></th></tr><tr><th></th><th></th><th></th><th>dBuV</th><th>dB</th><th>dBuV</th><th></th><th>dB</th><th></th></tr></thead><tbody><tr><td>1</td><td>0.168</td><td>25.00</td><td>55.08</td><td>-30.08</td><td>15.13</td><td>9.82</td><td>0.05</td><td>Average</td></tr><tr><td>2</td><td>0.168</td><td>39.46</td><td>65.08</td><td>-25.62</td><td>29.59</td><td>9.82</td><td>0.05</td><td>QP</td></tr><tr><td>3</td><td>0.186</td><td>22.55</td><td>54.20</td><td>-31.65</td><td>12.66</td><td>9.83</td><td>0.06</td><td>Average</td></tr><tr><td>4</td><td>0.186</td><td>35.47</td><td>64.20</td><td>-28.73</td><td>25.58</td><td>9.83</td><td>0.06</td><td>QP</td></tr><tr><td>5</td><td>0.204</td><td>19.28</td><td>53.45</td><td>-34.17</td><td>9.39</td><td>9.83</td><td>0.06</td><td>Average</td></tr><tr><td>6</td><td>0.204</td><td>30.97</td><td>63.45</td><td>-32.48</td><td>21.08</td><td>9.83</td><td>0.06</td><td>QP</td></tr><tr><td>7</td><td>15.470</td><td>21.97</td><td>50.00</td><td>-28.03</td><td>11.12</td><td>10.24</td><td>0.61</td><td>Average</td></tr><tr><td>8</td><td>15.470</td><td>26.68</td><td>60.00</td><td>-33.32</td><td>15.83</td><td>10.24</td><td>0.61</td><td>QP</td></tr><tr><td>9</td><td>20.924</td><td>23.09</td><td>50.00</td><td>-26.91</td><td>12.06</td><td>10.35</td><td>0.68</td><td>Average</td></tr><tr><td>10</td><td>20.924</td><td>27.70</td><td>60.00</td><td>-32.30</td><td>16.67</td><td>10.35</td><td>0.68</td><td>QP</td></tr><tr><td>11*</td><td>24.000</td><td>31.83</td><td>50.00</td><td>-18.17</td><td>20.70</td><td>10.44</td><td>0.69</td><td>Average</td></tr><tr><td>12</td><td>24.000</td><td>35.75</td><td>60.00</td><td>-24.25</td><td>24.62</td><td>10.44</td><td>0.69</td><td>QP</td></tr></tbody></table>					Freq	Level	Limit	Over	Read	Factor	Cable	Remark		MHz	dBuV	Line	Limit	Level	dB	loss					dBuV	dB	dBuV		dB		1	0.168	25.00	55.08	-30.08	15.13	9.82	0.05	Average	2	0.168	39.46	65.08	-25.62	29.59	9.82	0.05	QP	3	0.186	22.55	54.20	-31.65	12.66	9.83	0.06	Average	4	0.186	35.47	64.20	-28.73	25.58	9.83	0.06	QP	5	0.204	19.28	53.45	-34.17	9.39	9.83	0.06	Average	6	0.204	30.97	63.45	-32.48	21.08	9.83	0.06	QP	7	15.470	21.97	50.00	-28.03	11.12	10.24	0.61	Average	8	15.470	26.68	60.00	-33.32	15.83	10.24	0.61	QP	9	20.924	23.09	50.00	-26.91	12.06	10.35	0.68	Average	10	20.924	27.70	60.00	-32.30	16.67	10.35	0.68	QP	11*	24.000	31.83	50.00	-18.17	20.70	10.44	0.69	Average	12	24.000	35.75	60.00	-24.25	24.62	10.44	0.69	QP
	Freq	Level	Limit	Over	Read	Factor	Cable	Remark																																																																																																																																		
	MHz	dBuV	Line	Limit	Level	dB	loss																																																																																																																																			
			dBuV	dB	dBuV		dB																																																																																																																																			
1	0.168	25.00	55.08	-30.08	15.13	9.82	0.05	Average																																																																																																																																		
2	0.168	39.46	65.08	-25.62	29.59	9.82	0.05	QP																																																																																																																																		
3	0.186	22.55	54.20	-31.65	12.66	9.83	0.06	Average																																																																																																																																		
4	0.186	35.47	64.20	-28.73	25.58	9.83	0.06	QP																																																																																																																																		
5	0.204	19.28	53.45	-34.17	9.39	9.83	0.06	Average																																																																																																																																		
6	0.204	30.97	63.45	-32.48	21.08	9.83	0.06	QP																																																																																																																																		
7	15.470	21.97	50.00	-28.03	11.12	10.24	0.61	Average																																																																																																																																		
8	15.470	26.68	60.00	-33.32	15.83	10.24	0.61	QP																																																																																																																																		
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Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).																																																																																																																																										

3.2 RF Output Power

3.2.1 Limit of RF Output Power

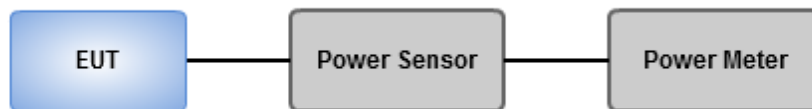
Conducted power shall not exceed 1Watt.

Antenna gain $\leq 6\text{dBi}$, no any corresponding reduction is in output power limit.

3.2.2 Test Procedures

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.2.3 Test Setup



3.2.4 Test Result of Maximum Output Power

Ambient Condition	24°C / 66%	Tested By	Aska Huang
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Peak Power / Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	23.17	0.20749
802.11g_Nss1,(6Mbps)_2TX	28.79	0.75683
802.11n HT20_Nss1,(MCS0)_2TX	28.57	0.71945
802.11n HT40_Nss1,(MCS0)_2TX	28.15	0.65313

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1, (1Mbps)2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.79	18.09	18.37	21.24	30.00	24.03	36.00
2437MHz	Pass	2.79	20.07	20.24	23.17	30.00	25.96	36.00
2462MHz	Pass	2.79	19.21	19.12	22.18	30.00	24.97	36.00
802.11g_Nss1, (6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.79	23.87	24.02	26.96	30.00	29.75	36.00
2437MHz	Pass	2.79	25.72	25.83	28.79	30.00	31.58	36.00
2462MHz	Pass	2.79	23.99	23.96	26.99	30.00	29.78	36.00
802.11n HT20_Nss1, (MCS0)2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.79	22.38	22.58	25.49	30.00	28.28	36.00
2437MHz	Pass	2.79	25.68	25.44	28.57	30.00	31.36	36.00
2462MHz	Pass	2.79	21.42	21.15	24.30	30.00	27.09	36.00
802.11n HT40_Nss1, (MCS0)2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	2.79	19.68	20.12	22.92	30.00	25.71	36.00
2437MHz	Pass	2.79	25.04	25.23	28.15	30.00	30.94	36.00
2452MHz	Pass	2.79	19.9	19.85	22.89	30.00	25.68	36.00

DG = Directional Gain; Port X = Port X output power

Average Power / Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	20.58	0.11429
802.11g_Nss1,(6Mbps)_2TX	20.51	0.11246
802.11n HT20_Nss1,(MCS0)_2TX	20.44	0.11066
802.11n HT40_Nss1,(MCS0)_2TX	18.63	0.07295

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps) 2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.79	15.52	15.82	18.68	-	21.47	-
2437MHz	Pass	2.79	17.5	17.64	20.58	-	23.37	-
2462MHz	Pass	2.79	16.62	16.53	19.59	-	22.38	-
802.11g_Nss1,(6Mbps) _2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.79	13.56	13.72	16.65	-	19.44	-
2437MHz	Pass	2.79	17.43	17.57	20.51	-	23.30	-
2462MHz	Pass	2.79	13.77	13.56	16.68	-	19.47	-
802.11n HT20_Nss1, (MCS0)2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.79	12.81	12.99	15.91	-	18.70	-
2437MHz	Pass	2.79	17.8	17.03	20.44	-	23.23	-
2462MHz	Pass	2.79	12.02	11.78	14.91	-	17.70	-
802.11n HT40_Nss1, (MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	2.79	10.64	10.91	13.79	-	16.58	-
2437MHz	Pass	2.79	15.55	15.69	18.63	-	21.42	-
2452MHz	Pass	2.79	10.75	10.79	13.78	-	16.57	-

DG = Directional Gain; Port X = Port X output power

Note : Conducted average output power is for reference only

3.3 Unwanted Emissions into Restricted Frequency Bands

3.3.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.3.2 Test Procedures

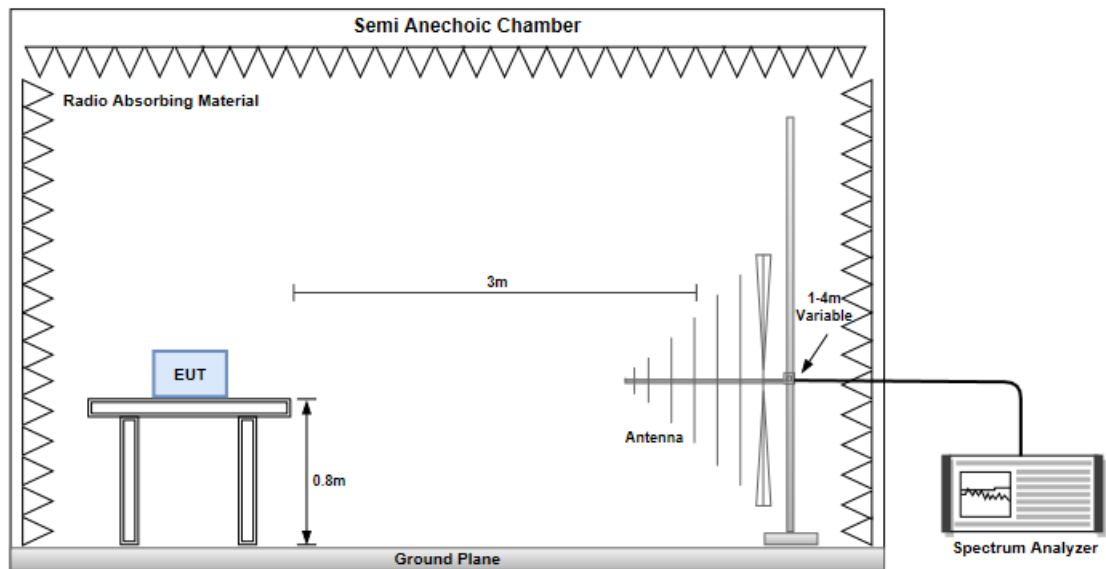
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

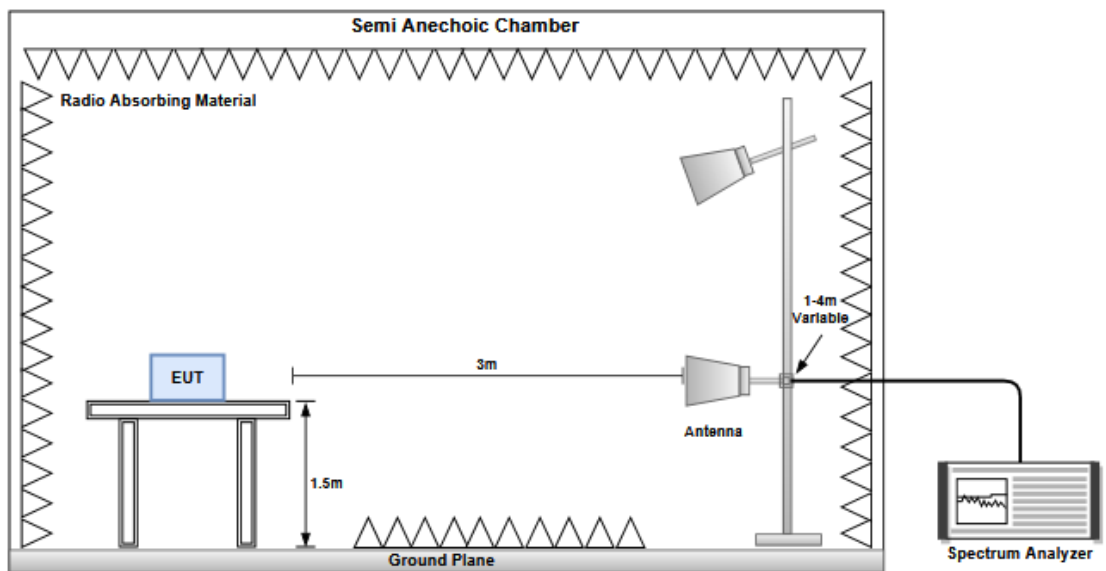
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.3.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



Test Configuration 1

3.3.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):25 Humidity(%):65			
Level (dBUV/m)			

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):25 Humidity(%):65			
Level (dBuV/m) </			

3.3.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	11b	Test Freq. (MHz)	2412						
Polarization	Horizontal								
Test By :Roger Lu Temperature(°C):25 Humidity(%):66									
Level (dBUV/m) Frequency (MHz)									
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	1206.00	39.42	54.00	-14.58	47.44	-8.02	Average	139	35
2	1206.00	48.55	74.00	-25.45	56.57	-8.02	Peak	139	35
3	1608.00	37.46	54.00	-16.54	44.25	-6.79	Average	128	70
4	1608.00	48.28	74.00	-25.72	55.07	-6.79	Peak	128	70
5	2390.00	39.37	54.00	-14.63	42.16	-2.79	Average	135	143
6	2390.00	49.92	74.00	-24.08	52.71	-2.79	Peak	135	143
7	3618.00	29.48	54.00	-24.52	29.25	0.23	Average	100	267
8	3618.00	41.60	74.00	-32.40	41.37	0.23	Peak	100	267
9	4824.00	31.68	54.00	-22.32	28.21	3.47	Average	100	127
10	4824.00	43.79	74.00	-30.21	40.32	3.47	Peak	100	127
11	12060.00	43.36	54.00	-10.64	29.04	14.32	Average	100	40
12	12060.00	56.48	74.00	-17.52	42.16	14.32	Peak	100	40

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		
Test By :Roger Lu Temperature(°C):25 Humidity(%):66			
Level (dBuV/m)			

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m)			

Modulation	HT20		Test Freq. (MHz)		2412	
Polarization	Vertical					
Test By :Akun Chung Temperature(°C):24 Humidity(%):67						
Level (dBuV/m) <						

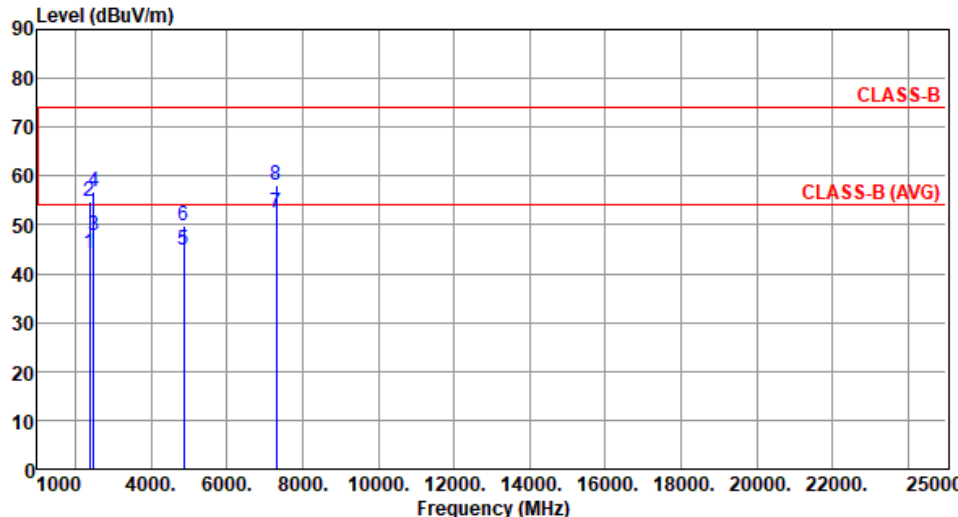
Test Configuration 2

3.3.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Roger Lu Temperature(°C):24 Humidity(%):62			
Level (dBuV/m) <			

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Roger Lu Temperature(°C):24 Humidity(%):62			
Level (dBuV/m)			

3.3.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	11b	Test Freq. (MHz)	2437																																																																																										
Polarization	Horizontal																																																																																												
Test By :Akun Chung Temperature(°C):24 Humidity(%):67																																																																																													
Level (dBUV/m)  <table><tr><th></th><th>Freq. MHz</th><th>Emission level dBUV/m</th><th>Limit dBUV/m</th><th>Margin dB</th><th>SA reading dBUV</th><th>Factor dB/m</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr><tr><td>1</td><td>2390.00</td><td>44.08</td><td>54.00</td><td>-9.92</td><td>46.87</td><td>-2.79</td><td>Average</td><td>308</td><td>18</td></tr><tr><td>2</td><td>2390.00</td><td>54.96</td><td>74.00</td><td>-19.04</td><td>57.75</td><td>-2.79</td><td>Peak</td><td>308</td><td>18</td></tr><tr><td>3</td><td>2483.50</td><td>47.71</td><td>54.00</td><td>-6.29</td><td>50.45</td><td>-2.74</td><td>Average</td><td>308</td><td>18</td></tr><tr><td>4</td><td>2483.50</td><td>56.89</td><td>74.00</td><td>-17.11</td><td>59.63</td><td>-2.74</td><td>Peak</td><td>308</td><td>18</td></tr><tr><td>5</td><td>4874.00</td><td>44.79</td><td>54.00</td><td>-9.21</td><td>41.34</td><td>3.45</td><td>Average</td><td>333</td><td>10</td></tr><tr><td>6</td><td>4874.00</td><td>49.79</td><td>74.00</td><td>-24.21</td><td>46.34</td><td>3.45</td><td>Peak</td><td>333</td><td>10</td></tr><tr><td>7</td><td>7311.00</td><td>52.56</td><td>54.00</td><td>-1.44</td><td>43.57</td><td>8.99</td><td>Average</td><td>101</td><td>195</td></tr><tr><td>8</td><td>7311.00</td><td>58.04</td><td>74.00</td><td>-15.96</td><td>49.05</td><td>8.99</td><td>Peak</td><td>101</td><td>195</td></tr></table>					Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg	1	2390.00	44.08	54.00	-9.92	46.87	-2.79	Average	308	18	2	2390.00	54.96	74.00	-19.04	57.75	-2.79	Peak	308	18	3	2483.50	47.71	54.00	-6.29	50.45	-2.74	Average	308	18	4	2483.50	56.89	74.00	-17.11	59.63	-2.74	Peak	308	18	5	4874.00	44.79	54.00	-9.21	41.34	3.45	Average	333	10	6	4874.00	49.79	74.00	-24.21	46.34	3.45	Peak	333	10	7	7311.00	52.56	54.00	-1.44	43.57	8.99	Average	101	195	8	7311.00	58.04	74.00	-15.96	49.05	8.99	Peak	101	195
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg																																																																																				
1	2390.00	44.08	54.00	-9.92	46.87	-2.79	Average	308	18																																																																																				
2	2390.00	54.96	74.00	-19.04	57.75	-2.79	Peak	308	18																																																																																				
3	2483.50	47.71	54.00	-6.29	50.45	-2.74	Average	308	18																																																																																				
4	2483.50	56.89	74.00	-17.11	59.63	-2.74	Peak	308	18																																																																																				
5	4874.00	44.79	54.00	-9.21	41.34	3.45	Average	333	10																																																																																				
6	4874.00	49.79	74.00	-24.21	46.34	3.45	Peak	333	10																																																																																				
7	7311.00	52.56	54.00	-1.44	43.57	8.99	Average	101	195																																																																																				
8	7311.00	58.04	74.00	-15.96	49.05	8.99	Peak	101	195																																																																																				
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).																																																																																													

Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m)			

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBUV/m)			

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m) <			

Test Configuration 3

3.3.8 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Roger Lu Temperature(°C):24 Humidity(%):62			
Level (dBUV/m)			

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Roger Lu Temperature(°C):24 Humidity(%):62			
Level (dBuV/m) </			

3.3.9 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m) </			

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m) <			

Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m) <			

Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m)			

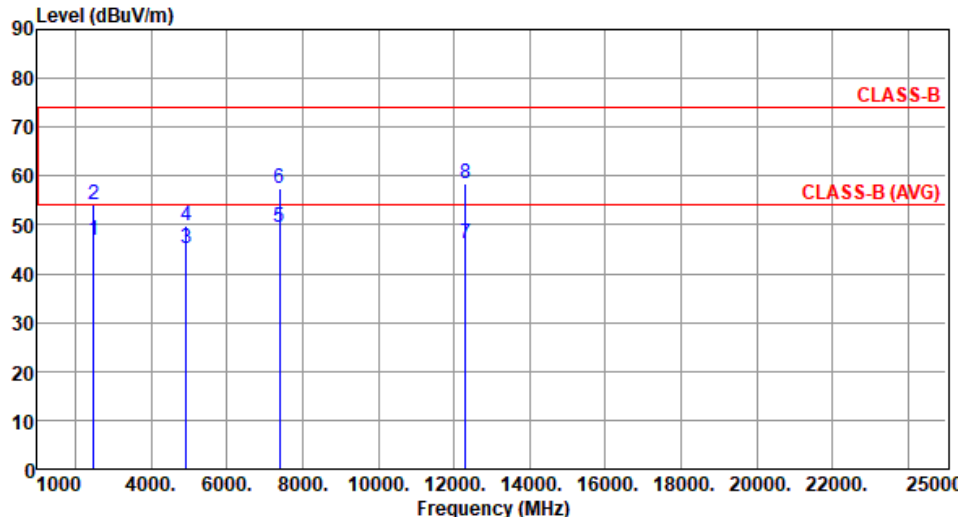
Test Configuration 4

3.3.10 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Roger Lu Temperature(°C):24 Humidity(%):62			
Level (dBuV/m) </			

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Roger Lu Temperature(°C):24 Humidity(%):62			
Level (dBuV/m)			

3.3.11 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	11b	Test Freq. (MHz)	2462																																																																																																														
Polarization	Horizontal																																																																																																																
Test By :Akun Chung Temperature(°C):24 Humidity(%):67																																																																																																																	
Level (dBuV/m)  <table><tr><td></td><td>Freq.</td><td>Emission</td><td>Limit</td><td>Margin</td><td>SA</td><td>Factor</td><td>Remark</td><td>ANT</td><td>Turn</td></tr><tr><td></td><td>MHz</td><td>level</td><td></td><td></td><td>reading</td><td></td><td></td><td>High</td><td>Table</td></tr><tr><td></td><td></td><td>dBuV/m</td><td>dBuV/m</td><td>dB</td><td>dBuV</td><td>dB/m</td><td></td><td>cm</td><td>deg</td></tr><tr><td>1</td><td>2483.50</td><td>46.80</td><td>54.00</td><td>-7.20</td><td>49.54</td><td>-2.74</td><td>Average</td><td>105</td><td>186</td></tr><tr><td>2</td><td>2483.50</td><td>54.21</td><td>74.00</td><td>-19.79</td><td>56.95</td><td>-2.74</td><td>Peak</td><td>105</td><td>186</td></tr><tr><td>3</td><td>4924.00</td><td>45.18</td><td>54.00</td><td>-8.82</td><td>41.63</td><td>3.55</td><td>Average</td><td>287</td><td>13</td></tr><tr><td>4</td><td>4924.00</td><td>49.94</td><td>74.00</td><td>-24.06</td><td>46.39</td><td>3.55</td><td>Peak</td><td>287</td><td>13</td></tr><tr><td>5</td><td>7386.00</td><td>49.52</td><td>54.00</td><td>-4.48</td><td>40.55</td><td>8.97</td><td>Average</td><td>385</td><td>204</td></tr><tr><td>6</td><td>7386.00</td><td>57.52</td><td>74.00</td><td>-16.48</td><td>48.55</td><td>8.97</td><td>Peak</td><td>385</td><td>204</td></tr><tr><td>7</td><td>12310.00</td><td>46.13</td><td>54.00</td><td>-7.87</td><td>31.88</td><td>14.25</td><td>Average</td><td>214</td><td>167</td></tr><tr><td>8</td><td>12310.00</td><td>58.40</td><td>74.00</td><td>-15.60</td><td>44.15</td><td>14.25</td><td>Peak</td><td>214</td><td>167</td></tr></table> Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).					Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn		MHz	level			reading			High	Table			dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg	1	2483.50	46.80	54.00	-7.20	49.54	-2.74	Average	105	186	2	2483.50	54.21	74.00	-19.79	56.95	-2.74	Peak	105	186	3	4924.00	45.18	54.00	-8.82	41.63	3.55	Average	287	13	4	4924.00	49.94	74.00	-24.06	46.39	3.55	Peak	287	13	5	7386.00	49.52	54.00	-4.48	40.55	8.97	Average	385	204	6	7386.00	57.52	74.00	-16.48	48.55	8.97	Peak	385	204	7	12310.00	46.13	54.00	-7.87	31.88	14.25	Average	214	167	8	12310.00	58.40	74.00	-15.60	44.15	14.25	Peak	214	167
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn																																																																																																								
	MHz	level			reading			High	Table																																																																																																								
		dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg																																																																																																								
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3	4924.00	45.18	54.00	-8.82	41.63	3.55	Average	287	13																																																																																																								
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Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m)			

Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):25 Humidity(%):66			
Level (dBUV/m) <			

Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):25 Humidity(%):66			
Level (dBUV/m)			

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

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City 33381, Taiwan (R.O.C.)

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If you have any suggestion, please feel free to contact us as below information.

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